GENDER DIFFERENTIAL AND SOCIAL DETERMINANTS ON TREATMENTS OF TUBERCULOSIS/HIV CO-INFECTED PATIENTS

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Background

The growing consensus, globally indicates that progress in tuberculosis control in the low and middle-income countries will require not only increasing investment in tuberculosis control programs, diagnostics, and treatment but also action on the social determinants of tuberculosis. This study is designed to examine gender differentials and social determinants in the treatment outcome of tuberculosis/HIV co-infected patients. Gender explores the sociocultural roles assigned to men and women, and the dynamics between them. These roles and dynamics are almost always present and, along with one's biological sex, are important drivers of TB outcomes. Gender influences transmission, testing, treatment, and adherence, and outcome data clearly reflect gender inequalities.

Methods

The study used the datasets that was obtained from the Direct Observed Treatment Short (DOTS) Clinic of the Nigerian Institute of Medical Research (NIMR). One among the parastatal under the Federal Ministry of Health that had treated over 5000 TB patients in the last 5 years (2011-2016). All the patients enrolled between 2011 and 2016 were the study population for the study but the patients who were co-infected with TB and HIV were used as the focus of this study. The eligible patients for this study comprises of 190 male and 280 female patients making a total sum of 470 patients in all. These patients were diagnosed, subjected to the same control treatment rate, pre-clinical evaluation, clinical observations and disease results outcome, these form the different levels of statistical analysis. Comparative Univariate Analysis (CUA) was employed while Controlled Cross-Tabulation (CCT) was used for bivariate analysis while control for the gender.

Findings and Conclusion

It was found that there was no gender difference in the treatment/control rates in the study but there were notable gender differential in the social factors that influences the TB/HIV co-infected patients.Among the females; pregnancy status, age and occupation were influential factors associated with TB having respective Chi-square (X^2=95.85, p=0.000),X^2=117.37,p=0.000 and X^2=207.68, p=0.000 while among the male patients, occupation, age and marital status was found to be significantly associated with TB having chi-Square (X^2=87.41, p=0.003), (X^2=111.43,p=0.000) and (X^2=35.57, p=0.017). There was no significant gender difference on pre-clinical

evaluations and clinical observations. But there was a significant gender differential in the result treatment outcome as type of occupation of male patients was associated with treatment outcome of TB/HIV co-infected patients with chi-square (X^2) =25.00, p=0.02. We discovered that there are gender differential in the social-determinants in the treatment outcome of TB/HIV co-infected patients in the study area. Thus it is very crucial to give special attention to gender equity and consideration to that vulnerable groups.

Keywords: Gender Difference, Tuberculosis, HIV and Social Determinants

INTRODUCTION:

In the recent time, the growing consensus indicates that progress in tuberculosis control in the low and middle-income countries like Nigeria, will require not only increasing investment in tuberculosis control programs, diagnostics, and treatment but also action on the social determinants of tuberculosis, especially among women in these part of the world. In the global report of WHO in 2016 on global burden on TB, it was reported that there were 10.4 million incident TB cases worldwide and majority of which were in low income countries, especially African countries. Nigeria is among the 14 high burden countries for TB, TB/HIV with Bangladesh, China, DPR Korea, DR Congo, Ethiopia, India, Indonesia, Kazakhstan, Kenya, among the list [22]. Nigeria is ranked seventh among the 30 high TB burden countries and second in Africa. The delinquent of TB in Nigeria has been made worse in recent time. It is estimated that the estimated incidence of TB in Nigeria is 322 per 100 000 population with only 15% of the total burden of the disease in the country being notified in 2015 [21]. Therefore, achieving the reduction in TB incidence rate for attainment of the 90-90-90 target of the *END-TB strategy* will be a mirage, if something drastic is not done.

The role of social determinants on TB/HIV co-infected mortality in South West Ethiopia, the study of Hailey, Birtukan, Desalegn, Amonuel, Hafte and Lillian; age of patients, especially the young adults, most within age25-34yes, sex of patients, rural residence and occupation of respondents were found to be associated with poor outcome of TB [20].

The work of Nogueiro, Rolla, Akrami and Kiene on factors associated with treatment delay in TB patients co-infected with HIV in the highly prevalence area in Brazil, found that 82days was the median time from initial symptoms of TB to prescription. Their work found that illiteracy was associated with greater healthcare delay in treatment of TB. As the most populated country of Latin America, Brazil accounts for more than 40% of all new HIV infections in the region, with an estimated prevalence of 0.4-0.6% in 2015, it was reported, that there was estimated 830,000 in previous HIV (PLHIV) in Brazil, 44,00 new HIV infections and 15,000 AIDS-related death [18].

More so, the concept of gender analysis entails a greater understanding in gender power relations and how experiences differs in the causes and consequences of public health issues and how services and policies might address this gender differences. It should be noted that gender dynamics affects health system in the area of needs, experience and outcome. Gender explores the sociocultural roles assigned to men and women, and the dynamics between them. These roles and dynamics are almost always present and, along with one's biological sex, are important drivers of TB outcomes. Gender influences transmission, testing, treatment, and adherence, and outcome data clearly reflect gender inequalities. Gender influences medical products, data collection and health seeking

behavior especially among the vulnerable population. The demographic transition does not inherently produce gender equity and the empowerment of women, but it creates the conditions under which they are much more likely to happen. Tuberculosis plays a key role in HIV associated mortality in the country especially among the women. Health seeking social behavior, economic, and political impediment to empowerment of women should be encouraged, instead of women been seen as "codependents" in the system of male domination can greatly influence the effectiveness of targeted interventions, which can keep patients free of TB in the early stages of their treatment are required to reduce TB related mortality.

Nigeria is also one of the countries included among the high burden countries for TB, TB/HIV co-infected cases [17]. According to WHO report the incidence of HIV+TB cases in Nigeria was 418 per (273-594) thousand population while death incidence that excludes HIV+TB was 120 (70-180) per thousand[19]. The prevalence of any drug resistance among new cases was 32% from the study of Onyedun et.al; they disclosed that the burden of MDR-TB was high occurring in 6.0% of new and 32% of previously-treated TB patients[17].

Human immunodeficiency virus (HIV) infection and tuberculosis (TB) not only constitute an unresolved public health challenge in sub-Saharan Africa but also in the entire world. The World Health Organization (WHO) estimated that in 2013, 9 million people developed TB and 1.5 million died from the disease globally, a quarter of which occurred in Africa. Growing awareness of the importance of social determinants of health in other areas, particularly HIV/AIDS, has stimulated interest in the role of these determinants for other communicable diseases such as TB, HIV and other STI. Major advancements have been made in diagnosis and treatment of HIV/AIDS, but arguably more significant in the last 10 years has been the unparalleled emphasis on social determinants of HIV/AIDS risk and treatment access. An explosion of research has occurred into how gender-based and socioeconomic inequalities of opportunity undermine individual efforts to avoid HIV infection and receive effective treatment. [24][23][13]; [15][4][5][1].This poses great concerns for different scholars in the world, African and Nigeria as to keenly look at gender differentials and social determinant of TBs/HIV co-infectious patients in Nigeria while the main objective of this study was to examine the gender differential on treatment outcome of TB/HIV co-infected patients treated at Nigerian Institute of Medical Research (NIMR).

Consistent with principles of primary health care as stated by Alma Ata declaration, and in order to achieve better disease outcomes, intervention frameworks that address TB/HIV mortality should not only focus on the medical interventions of diseases, but should also integrate and improve social determinants of affected populations [13]. The role of social determinants on TB/HIV co-infected patients can never be over emphasized, in the work of Gesesew et.al; carried out in Ethiopia, age of patients especially the young age, sex of patients (females) occupation and place of residence and wealth status were significantly related to treatment outcome of TB/HIV co-infected patients. The study conducted to explore the social determinants of TB and their association with TB/HIV co-infection, in order to inform TB control strategies that would lead to appropriate action for impact, Describing the social determinants of TB and their association with TB/HIV co-infection highlighted a number of opportunities to strengthen control beyond the Stop TB Strategy [3].The work modeled the relationship between incident TB and change in CD4 count over the follow-up period. There was high incidence of TB in the studied HIV cohort with a deleterious effect on the outcome of ART treatment. The need for early TB screening and re-screening among all

HIV patients was discussed and recommended by the study [10]. Their findings revealed that the magnitude of TB /HIV co-infection in Ethiopia is increasing and deserves special attention. Low CD4 count and advanced WHO stage are contributing factors for dual infection deduced by [8]. Their research revealed that Tuberculosis plays a key role in HIV associated mortality. Targeted interventions which can keep patients free of TB in the early stages of their treatment are required to reduce TB related mortality [11].They concluded that Active TB is prevalent among HIV patients while receiving ART in northwestern Tanzania which is independently associated with male gender, advanced HIV disease, and nonuse of IPT. Universal HIV testing could reduce late HIV diagnosis and hence reduce the risk of developing TB while receiving ART in our setting. Also IPT should be widely used for those who are negative for TB on screening [2]. They analyzed the incidence of TB over 10 years from initiation of HIV treatment among 345 HIV treatment-naïve persons, who were enrolled in a cohort in Kano, Nigeria. They concluded that there was high incidence of TB in the studied HIV cohort with a deleterious effect on the outcome of ART treatment. There is need for early TB screening and re-screening among all HIV patients [9].

OBJECTIVES OF THE STUDY

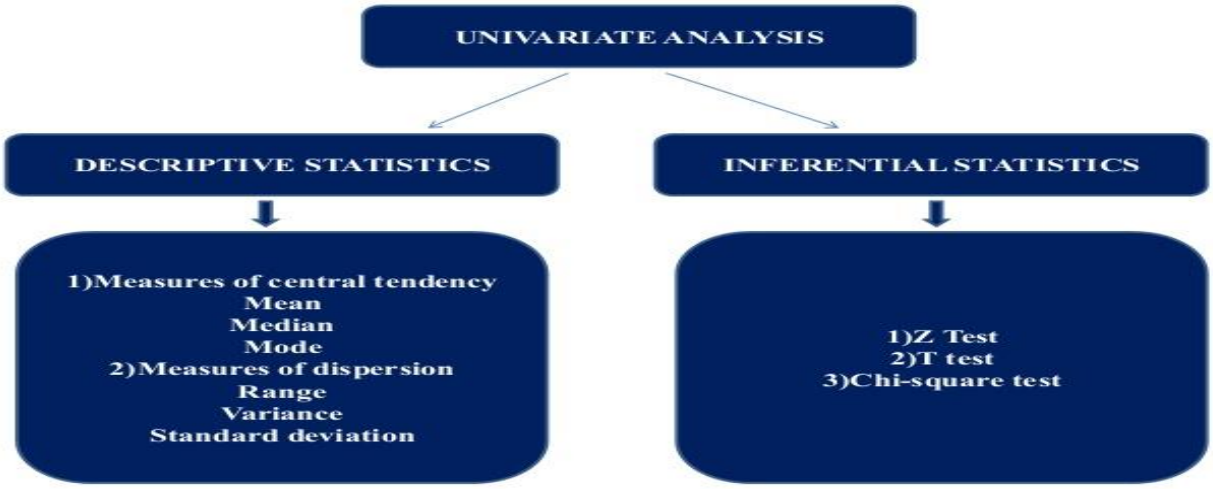
The overall objectives of the study were design to examine gender differentials and social determinants on the treatment outcome of TB/HIV co-infected patients in Nigeria. While the specific objective was to explore the demographic and social factors that are associated with incidence and treatment outcome of these patients by considering their gender qualities.

METHODOLOGY

The study used the datasets that was obtained from the Direct Observed Treatment Short (DOTS) Clinic of the Nigerian Institute of Medical Research (NIMR), an agency under the Federal Ministry of Health that has treated over 5000 TB patients in the last 5 years (2011-2016). All the patients enrolled between 2011 and 2016 were study population for the study but the patients which were co-infected with TB and HIV was used as the focus of this study. The eligible patients for this study comprises of 190 male and 280 female patients making a total sum of 470 patients in all. These patients were diagnosed, subjected to the same control treatment rate, pre-clinical evaluation, clinical observations and disease results outcome, these form the different levels of statistical analysis. Comparative Univariate Analysis (CUA) was employed while Controlled Cross-Tabulation (CCT) was used for bivariate analysis while control for the gender.

Comparative Univariate analysis(CUA) is a simplest form of statistical techniques like other forms of statistics, it could be inferential or descriptive in nature while the difference between this and other normal univariate is that this methods compare two groups seeking to see similarities/different in the targeted group. The key fact is that only two variables are involved.

Controlled Cross-Tabulation (CCT) this involve multivariate analysis along the same comparison but in this stage, the factor of interest were subjected to controlled trail to control for gender differential as this study is concern.



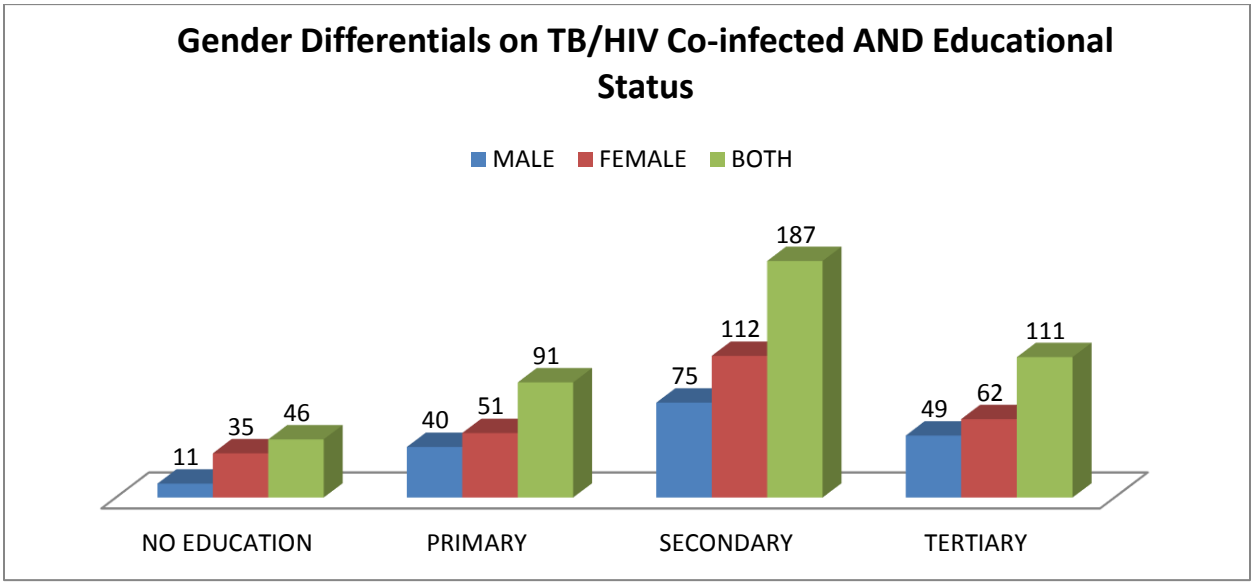
Results and Discussions of Findings

The demographic characteristics of TB/HIV co-infected patients show that there are gender differences in age, highest level of education, marital status and occupation. Majority were females, from which 42.1% of them were within age 30-39yrs which happened to be majority, those in ages 40-49yrs were (23.6%) and 15.4% were from ages 20-29yrs. More than 48% of female who were infected with TB/HIV were divorced/separated while 26% were married and remainder were single. This implies that females who mostly infected by TB/HIV were mostly within ages 30-39yrs. It should be note that this happen to be the stage where female experience high sexually pressure. TB/HIV co-infected patients were also found to be common among females who were engaged in petty traders/self-skill patients, as petty trader were (36%) of the most diseased female patients, manual self-skill (22%) unemployed female (14%) but TB is rare among females who were house wife, civil servants, professional skill workers like journalist, nursing and the likes. But the majority female who engaged in petty trading, the kind of business that gives female opportunity to move around hawking their goods and most of them could be victim of rapes and other circumstances from "big daddy" or "big boys" in their neighborhood who claim to support their petty business. This suggests that a female who engage in lonely occupation or who feels lonely is at risk of engaging in sexual compulsive behaviour and may end up engaging in various forms of sexual risk behaviour. Chaney and Burns-Wortham [23] also informed that loneliness along with non-disclosure of sexual orientation to mother and self-esteem predict sexual compulsivity. These suggest the relevance of occupation in determining sexual behaviour and TB incidence.

TB/HIV co-infected patients was found to be more prominent among female who had secondary ducation as 43.1% of those who had been infected with HIV/TB possessed secondary education, 24% had tertiary education while 15.4% had no education and 13.5% had primary education. The women at this level of education do not have

enough exposure to preventive behavior such as contraceptive which make them at risk of contracting TB/HIV. This findings was differed to the work of Nogueira et. al in Nigeria who reported that illiteracy was found to be associated with delayed in treatment of TB because education at that level is still consider as being low[16]. But in this context higher literacy were most infected.

Furthermore, the socio-demographic characteristics of TB/HIV co-infected patients who were males revealed that most of them had secondary education (43.9%), followed by those with tertiary education (28%) and 22.9% had primary education. Also, thus implies that low level of educational attainment is associated with infection of TB/HIV in the study area. Also, the occupation was found to influence TB infection as TB patients were common among the commercial driver(16%), Manual self-skill business like mechanic, bricklayer etc(16.9%) and petty trader (13.8%) compare with others occupation who had fewer proportion civil servants (4.8%), sport/private company (4.2%). TB was also found to be prominent among married men as (60.6%) of male infected with TB/HIV were married, 25.7% were single while only 6.9% were separated/divorced and widowed (6.3%). It was found that the incidence increases as male patients increase in age, from (6.8%) among age (20-29yrs), it increases to 30.5% among ages (30-39yrs), 35.3% among age 40-49yrs. Details in table 1 on Socio-demographic characteristics of TB patients. This finding corresponds with Dodge et al. (2004) that men are more sexually compulsive in behaviour than women. This gender difference can be attributed to the socio-cultural factors that appear flexible towards the male in terms of sexual expression than to the female.



Gender Differentials on TB/HIV Co-infected Diagnosis

The diagnosed patients, 74.6% of the female was found to be negative while the 66.7% of male dignosed were negative, 11.6% male had early diagnosis on TB I (+) while7.1% among the female sought for such attention, 10.1% of the male had a possible acid fast bacterial AFB smear (+++) compared to female (7.5%).

The control treatment rate of TB patients increased the percentage of negative diagnosed from 66.7% among the male to 92.3% while that of females increase from 74.6% to 95.9%. The preclinical evaluation shows that 18.9% were negative among male and the 16.8% among the females while 82.9% and 80.5% missed preclinical evaluation

among males and females patients respectively. The clinical observation disclosed that 81.8%of the females got completed dose and were cured but 17.5% missing and not certain about their cure. In the same veins, 71.4% of males had completed dose and were cured but 25.4% don't complete their dose and not cured. Unfortunately 2.6% of male died while less than 1% failed. The final disease results outcome showed that 98.6% of the females were positive result while 96.8% of the male were positive too. But 2.6% of the male were still negative while less than 1% of females were still negative.

From the result presented it is certainly not coincidence that those countries still in the earlier stages of the demographic transition are also those where the rights of women are most trampled. In Kenya and Tanzania, as in much of sub-Saharan Africa and South Asia, women's access to health and economic resources is restricted by severe limitations on their ability to inherit property, take decisions and own land (World Bank 1999). In India, women's access to the formal labor market is restricted, so women wind up in the informal sector, where they are far more likely to be economically exploited of which is also common in various region of Nigeria. ***See details in table 2 below***.

TABLE 2: Gender Differential in Relationship between Demographic Factors and Diagnosis (Obstructive and Reflux Uropathy) among TB/HIV patients

2a. Diagnosis

Demographic Factors	Male		Female	
	X^2	p-value	X^2	p-value
Pregnancy Status	-	-	95.85	0.000
Education	14.39	0.498	14.270	0.711
Occupation	87.41	0.003	117.37	0.000
Marital Status	35.57	0.017	14.818	0.93
Age	111.43	0.000	207.68	0.000

2b. Treatment Control Rate of TB/HIV

Demographic Factors	X^2	p-value	X^2	p-value
Pregnancy Status	-	-	4.181	0.65
Education	3.69	0.93	9.44	0.39
Occupation	34.82	0.14	20.32	0.91
Marital Status	5.98	0.92	10.13	0.34
Age	14.36	0.27	9.02	0.701

2c. Pre-Clinical Evaluation

Demographic Factors	X^2	p-value	X^2	p-value
Pregnancy Status	-	-	5.184	0.26
Education	5.56	0.471	4.518	0.61
Occupation	15.37	0.63	10.05	0.97
Marital Status	3.97	0.86	6.146	0.63
Age	4.44	0.82	10.86	0.21

2d. Clinical Observation

Demographic Factors	X^2	p-value	X^2	p-value
Pregnancy Status	-	-	2.27	0.68
Education	11.30	0.256	11.87	0.065
Occupation	25.755	0.53	6.89	0.99
Marital Status	5.76	0.12	9.69	0.288
Age	12.046	0.44	16.37	0.04

2d. Disease Result Outcome

Demographic Factors	X^2	p-value	X^2	p-value
Pregnancy Status	-	-	6.070	0.19
Education	9.580	0.14	6.103	0.41
Occupation	25.00	0.02	14.730	0.79
Marital Status	7.00	0.53	2.350	0.96
Age	4.52	0.81	8.719	0.36

Conclusion and Recommendations

TB can therefore be considered a social problem in which it spread is causing contagious cases, representing a pollution that spoils the quality of life in a society and make it inhabitable for members. Conclusively, this study established that, there are gender differential in the social-determinants in the treatment outcome of TB/HIV co-infected patients in the study area. Thus it is very crucial to give special attention and consideration to that vulnerable groups; women in age (30-39years), married men, patient's occupational (petty traders and commercial drivers as well as bus stop hawkers/ vendors) which were found to be associated to TB/HIV in both sexes. These selected individuals should be given proper interventions and sensitization. Also, because of the close relationship

between HIV and TB in notable sub-sahara African in which Nigeria is inclusive, this call for structural and social determinants of TB risk. Another major area of concern is the wide spread of inequalities in opportunities, vulnerability and expectation for men and women which is being reinforced through cultural norms and socio-economic system [4]. The fact still remains that there is a lacuna in understanding of the extent to which socioeconomic determinants initiates the current TB epidemic in Nigeria, while the underlying processes linking socioeconomic determinants to TB, and how to best address these determinants. However, we believe through this paper that taking TB control could be taken forward is both desirable and possible that current recognition of the importance of social determinants in addressing issue will help to provides a real opportunity to expand the current paradigm for TB control.

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APENDIX

Table 1: Socio-Demographic Factors among TB/HIV Co-infected Patients

Demographic Factors	SEX		Pooled
	MALE	FEMALE	
CURRENTLY PREGNANT			
NO	0	234	234
	0.00%	83.90%	52.80%
YES	0	2	2
	0.00%	0.70%	0.50%
NOT APPLICABLE	164	43	207
	100.00%	15.40%	46.70%
EDUCATION ATTAINMENT			
NO EDUCATION	11	35	46
	6.30%	13.50%	10.60%
PRIMARY	40	51	91
	22.90%	19.60%	20.90%
SECONDARY	75	112	187
	42.90%	43.10%	43.00%
TERTIARY	49	62	111
	28.00%	23.80%	25.50%
OCCUPATION/EMPLOYMENT STATUS			
UNEMPLOYED	26	39	65
	13.80%	14.00%	13.90%
BUSINESSMAN/WOMAN	14	9	23
	7.40%	3.20%	4.90%
PETTY TRADER/SELF SKILL BUSINESS	26	100	126
	13.80%	35.80%	26.90%
CIVIL SERVANTS	9	19	28
	4.80%	6.80%	6.00%
HOUSE WIFE	0	8	8
	0.00%	2.90%	1.70%

SPORT JOBS/PRIVATE COMPANY	8	4	12
	4.20%	1.40%	2.60%
STUDENTS	7	10	17
	3.70%	3.60%	3.60%
MANUAL SELF SKILL SERVICES	32	61	93
	16.90%	21.90%	19.90%
PROFESSIONAL SKILL SERVICES: Engineer, Doctor, Journalist, etc	15	15	30
	7.90%	5.40%	6.40%
Drivers	30	2	32
	15.90%	0.70%	6.80%
OTHERS JOBS, Farming, Agricultural, Labourers.	22	12	34
	11.60%	4.30%	7.30%
MARITAL STATUS			
NO RESPONSE	1	1	2
	0.60%	0.40%	0.50%
SINGLE	45	67	112
	25.70%	26.00%	25.90%
MARRIED	106	126	232
	60.60%	48.80%	53.60%
SEPARATED	12	27	39
	6.90%	10.50%	9.00%
WIDOWED	11	37	48
	6.30%	14.30%	11.10%
AGE OF PATIENTS			
<20yrs	21	22	43
	11.10%	7.90%	9.10%
20-29yrs	13	43	56
	6.80%	15.40%	11.90%
30-39yrs	58	118	176
	30.50%	42.10%	37.40%
40-49yrs	67	66	133
	35.30%	23.60%	28.30%
50+	31	31	62
	16.30%	11.10%	13.20%

TOTAL	**190**	**280**	**470**

Table 2: Gender Differentials on TB/HIV Co-infected Diagnosis

GENDER DIFFERENTIALS TB/HIV DIAGNOSED	SEX		Pooled
	MALE	FEMALE	
NEGATIVE	126	209	335
	66.7%	74.6%	71.4%
X RAY	8	13	21
	4.2%	4.6%	4.5%
POSITIVE (+)	22	20	42
	11.6%	7.1%	9.0%
POSITIVE (++)	7	8	15
	3.7%	2.9%	3.2%
POSITIVE (+++)	19	21	40
	10.1%	7.5%	8.5%
SCANTY	4	6	10
	2.1%	2.1%	2.1%
MANTOUX	3	3	6
	1.6%	1.1%	1.3%
TREATMENT CONTROL RATE OF TB			
NEGATIVE	120	208	328
	92.3%	95.9%	94.5%
POSITIVE (+)	5	3	8
	3.8%	1.4%	2.3%
POSITIVE (++)	1	2	3
	.8%	.9%	.9%
SCANTY	4	4	8
	3.1%	1.8%	2.3%
PRE-CLINICAL EVALUATION			
MISSING	153	232	385
	80.5%	82.9%	81.9%
NEGATIVE	36	47	83
	18.9%	16.8%	17.7%

POSITIVE (++)	0	1	1
	0.0%	.4%	.2%
SCANTY	1	0	1
	.5%	0.0%	.2%
CLINICAL OBSERVATION			
COMPLETED AND CURED	135	225	360
	71.4%	81.8%	77.6%
MISSING NOT COMPLETED	48	48	96
	25.4%	17.5%	20.7%
Failure	1	2	3
	.5%	.7%	.6%
Die	5	0	5
	2.6%	0.0%	1.1%
DISEASE RESULT /OUTCOME			
Positive	184	276	460
	96.8%	98.6%	97.9%
Negative	5	1	6
	2.6%	.4%	1.3%
MISSING	1	3	4
	.5%	1.1%	.9%
TOTAL	190	280	470